

### REMARKS

The following remarks are numbered according to the paragraph number of the Office Action to which it responds to.

1. At all relevant times, the present claims have been commonly owned.
2. A certified copy of the priority document will be filed shortly.
- 3-15. Examiner has rejected claims 1-11 as having been anticipated by Flaum et al. US Patent No. 6,140,817 (the "Flaum reference"). With respect, it is submitted that each of claims 1 to 11 are not anticipated by the Flaum reference.

The Flaum reference teaches a NMR logging tool used downhole in a wellbore which can accomplish the following, as stated in the abstract and in the summary of invention section:

1. Distinguish between light and heavy formation oil;
2. Determine residual oil saturation;
3. Determine permeability of the formation;
4. Determine bound water volume.

Please note that determining the oil or water fraction of an oil/water emulsion is not taught in this reference. The present invention is directed at methods and apparatuses for determining the oil or water fraction of an emulsion, and each claim is limited in that regard.

The point that Flaum does not teach such a determination is proven throughout the Flaum specification.

First, the only mention of water is that of "bound water" (see Column 3, lines 61-65). Bound water in a formation is not the same as an oil/water emulsion. Bound water

in a formation is water which is bound to solids, such as water wet rock (see Column 4, 66-67.

The difference between "bound water" and water in an oil/water emulsion is significant. The T2 of bound water is very short. At column 3, line 61-64, it is stated that:

"...the volume of bound water ...is associated with nuclear magnetic resonance signals that decay with a T2 *less than* a formation-dependent T2 cutoff." [emphasis added]

Again, at column 4, lines 66-67, it is stated that:

"The bound water (in water wet rock) has a very short relaxation time, and clearly the T1 of the oil phase should not be applied to it.

By contrast, the T2 of water in an oil/water emulsion is *longer* than the T2 of the oil it is mixed with. That clearly indicates that it is very different from the bound water referred to in the Flaum reference.

The present invention is based on the premise that one of the two fractions of an oil/water emulsion may be measured by measuring the summed amplitude of the T2 spectrum above or below a certain T2 value. For example, claim 1 measure oil content by measuring T2 times *less than* the T2 cutoff. Claim 3 measures water content by measuring T2 times *greater than* the T2 cutoff.

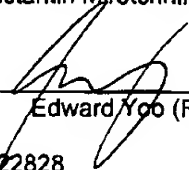
Although the Flaum reference does teach the use of NMR logging of a downhole formation, which may include bound water, it does not refer to an oil/water emulsion. Therefore, it does not teach a significant element of the present claimed invention.

### CONCLUSION

In view of the foregoing remarks and amendments, it is respectfully submitted that this application is in condition for allowance and allowance thereof is respectfully requested.

Respectfully submitted,

Konstantin Mirotchnik, et al.

By:   
Edward Yoo (Reg. No. 41,435)

CORRESPONDENCE ADDRESS – Customer No. 22828

FAX RECEIVED  
OCT 27 2003  
TECHNOLOGY CENTER 2200